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Recommended Childhood and Adolescent Immunization Schedule

Please note: An erratum has been published for this article. To view the erratum, please click [here](#). (see next paragraph)

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In the *MMWR* QuickGuide section titled "Recommended Childhood and Adolescent Immunization Schedule---United States, 2003," an error occurred in Table 1. In the "Dose one to dose two" column for Hib (6 wks), the second recommendation should read "8 wks (as final dose): if 1st dose given at age 12--14 months."

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Each year, CDC's Advisory Committee on Immunization Practices (ACIP) reviews the recommended childhood and adolescent immunization schedule to ensure that it is current with changes in manufacturers' vaccine formulations and contains revised recommendations for the use of licensed vaccines, including those newly licensed. The recommended childhood immunization schedule for 2003 has remained the same in content and format since January 2002 ([Figure 1](#)) (1). The recommendations and format have been approved by ACIP, the American Academy of Family Physicians, and the American Academy of Pediatrics.

Catch-Up Childhood and Adolescent Immunization Schedule

A new catch-up immunization schedule for children and adolescents who start late or who are >1 month behind is presented for the first time in 2003 ([Tables 1](#) and [2](#)). Minimum ages and minimum intervals between doses are provided for each of the routinely recommended childhood and adolescent vaccines. The schedule is divided into two age groups, children aged 4 months--6 years and children/adolescents aged 7--18 years.

Hepatitis B Vaccine

The schedule indicates a preference for administering the first dose of hepatitis B vaccine to all newborns soon after birth and before hospital discharge. Administering the first dose of hepatitis B vaccine soon after birth should minimize the risk for infection caused by errors or delays in maternal hepatitis B surface antigen (HBsAg) testing or reporting, or by exposure to persons with chronic hepatitis B virus (HBV) infection in the household, and can increase the child's likelihood of completing the vaccine series. Only monovalent hepatitis B vaccine can be used for the birth dose. Either monovalent or combination vaccine can be used to complete the series.

Four doses of hepatitis B vaccine can be administered to complete the series when a birth dose is given. In addition to receiving hepatitis B immune globulin (HBIG) and the hepatitis B vaccine series, infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg (anti-HBs) at age 9--15 months to identify those with chronic HBV infection or those who might require revaccination (2).

Influenza Vaccine

In addition to the recommendation to administer annual influenza vaccine to children at high risk, healthy children aged 6--23 months are encouraged to receive influenza vaccine when feasible. Children in this age group are at substantially increased risk for influenza-related hospitalizations (3).

Inactivated Poliovirus Vaccine

The inactivated poliovirus (IPV) vaccine footnote has been removed from the Recommended Childhood and Adolescent Immunization Schedule, reflecting the cessation of the use of oral poliovirus (OPV) vaccine in the United States. An all-IPV schedule for routine childhood poliovirus vaccination has been recommended in the United States since January 1, 2000 (4). All children should receive 4 doses of IPV at age 2, 4, and 6--18 months, and at age 4--6 years. For children who received an all-IPV or all-OPV series, a fourth dose is not necessary if the third dose was administered at age ≥ 4 years. If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered regardless of the child's current age. These statements clarify the "Dose Three to Booster Dose" column in [Table 2](#) of the catch-up schedule. Routine poliovirus vaccination is not generally recommended for persons aged ≥ 18 years residing in the United States (5).

Vaccine Supply Recommendations

As a result of the vaccine supply shortage, deferral of some doses of pneumococcal conjugate vaccine (PCV) has been recommended (6); health-care providers should record patients for whom vaccination has been deferred and should contact them once the supply has been restored. Supplies of tetanus and diphtheria toxoids (Td) vaccine; diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine; measles, mumps, and rubella (MMR) vaccine; and varicella vaccine in the United States have become sufficient to permit the resumption of the routine schedule for use as recommended by ACIP (7--9). The range of recommended ages for the Td vaccine has been extended to 18 years to emphasize that the vaccine can be administered during any visit if at least 5 years have elapsed since the last dose of tetanus and diphtheria toxoid--containing vaccine. Information about vaccine shortages is available from CDC's National Immunization Program at <http://www.cdc.gov/nip/news/shortages/default.htm>.

Vaccine Information Statements

The National Childhood Vaccine Injury Act requires that all health-care providers give parents or patients copies of Vaccine Information Statements before administering each dose of the vaccines listed in the schedule. Additional information is available from state health departments and at <http://www.cdc.gov/nip/publications/vis>. Detailed recommendations for using vaccines are available from the manufacturers' package inserts, ACIP statements on specific vaccines, and the *2000 Red Book* (10). ACIP statements for each recommended childhood vaccine can be viewed, downloaded, and printed from CDC's National Immunization Program at <http://www.cdc.gov/nip/publications/acip-list.htm>; instructions on the use of the Vaccine

Information Statements are available at <http://www.cdc.gov/nip/publications/vis/vis-instructions.pdf>.

References

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3. CDC. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2002;51(No. RR-3).
4. CDC. Updated recommendations on the use of pneumococcal conjugate vaccine in a setting of vaccine shortage---Advisory Committee on Immunization Practices. MMWR 2001;50:1140--2.
5. CDC. Recommendations of the Advisory Committee on Immunization Practices: revised recommendations for routine poliomyelitis vaccination. MMWR 1999;48:590.
6. CDC. Poliovirus prevention in the United States: updated recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2000;49(No. RR-5).
7. CDC. Resumption of routine schedule for tetanus and diphtheria toxoids. MMWR 2002;51:529--30.
8. CDC. Resumption of routine schedule for diphtheria and tetanus toxoids and acellular pertussis vaccine and for measles, mumps, and rubella vaccine. MMWR 2002;51:598--9.
9. CDC. Resumption of routine schedule for varicella vaccine. MMWR 2002;51:679.
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Figure 1

FIGURE. Recommended childhood and adolescent immunization schedule¹ — United States, 2003

Vaccine	Range of recommended ages				Catch-up vaccination				Preadolescent assessment			
	Birth	1 mo	2 mos	4 mos	6 mos	12 mos	15 mos	18 mos	24 mos	4–6 yrs	11–12 yrs	13–18 yrs
Hepatitis B ²	HepB #1	only if mother HBsAg (-)								HepB series		
Diphtheria, Tetanus, Pertussis ³			DTaP	DTaP	DTaP		DTaP			DTaP		Td
<i>Haemophilus influenzae</i> Type b ⁴			Hib	Hib	Hib		Hib					
Inactivated Polio			IPV	IPV	IPV				IPV			
Measles, Mumps, Rubella ⁵						MMR #1			MMR #2		MMR #2	
Varicella ⁶						Varicella			Varicella		Varicella	
Pneumococcal ⁷			PCV	PCV	PCV	PCV			PCV		PPV	
----- Vaccines below this line are for selected populations -----												
Hepatitis A ⁸											HepA series	
Influenza ⁹					Influenza (yearly)							

1. Indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2002, for children through age 18 years. Any dose not given at the recommended age should be given at any subsequent visit when indicated and feasible. [Hatched box] Indicates age groups that warrant special effort to administer those vaccines not given previously. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and the vaccine's other components are not contraindicated. Providers should consult the manufacturers' package inserts for detailed recommendations.

2. **Hepatitis B vaccine (HepB).** All infants should receive the first dose of HepB vaccine soon after birth and before hospital discharge; the first dose also may be given by age 2 months if the infant's mother is HBsAg-negative. Only monovalent HepB vaccine can be used to complete the series; 4 doses of vaccine may be administered when a birth dose is given. The second dose should be given at least 4 weeks after the first dose except for combination vaccines, which cannot be administered before age 6 weeks. The third dose should be given at least 16 weeks after the first dose and at least 8 weeks after the second dose. The last dose in the vaccination series (third or fourth dose) should not be administered before age 6 months. Infants born to HBsAg-positive mothers should receive HepB vaccine and 0.5 mL hepatitis B immune globulin (HBIG) within 12 hours of birth at separate sites. The second dose is recommended at age 1–2 months. The last dose in the vaccination series should not be administered before age 6 months. These infants should be tested for HBsAg and anti-HBs at 9–15 months of age. Infants born to mothers whose HBsAg status is unknown should receive the first dose of the HepB vaccine series within 12 hours of birth. Maternal blood should be drawn as soon as possible to determine the mother's HBsAg status; if the HBsAg test is positive, the infant should receive HBIG as soon as possible (no later than age 1 week). The second dose is recommended at age 1–2 months. The last dose in the vaccination series should not be administered before age 6 months.

3. **Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP).** The fourth dose of DTaP may be administered at age 12 months provided that 6 months have elapsed since the third dose and the child is unlikely to return at age 15–18 months. **Tetanus and diphtheria toxoids (Td)** is recommended at age 11–12 years if at least 5 years have elapsed since the last dose of Td-containing vaccine. Subsequent routine Td boosters are recommended every 10 years.

4. ***Haemophilus influenzae* type b (Hib) conjugate vaccine.** Three Hib conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB[®] or ComVax[®] [Merck]) is administered at age 2 and 4 months, a dose at age 6 months is not required. DTaP/Hib combination products should not be used for primary vaccination in infants at age 2, 4, or 6 months but can be used as boosters following any Hib vaccine.

5. **Measles, mumps, and rubella vaccine (MMR).** The second dose of MMR is recommended routinely at age 4–6 years but may be administered during any visit provided that at least 4 weeks have elapsed since the first dose and that both doses are administered beginning at or after age 12 months. Those who have not received the second dose previously should complete the schedule by the visit at age 11–12 years.

6. **Varicella vaccine.** Varicella vaccine is recommended at any visit at or after age 12 months for susceptible children (i.e., those who lack a reliable history of chickenpox). Susceptible persons aged ≥13 years should receive 2 doses given at least 4 weeks apart.

7. **Pneumococcal vaccine.** The heptavalent pneumococcal conjugate vaccine (PCV) is recommended for all children aged 2–23 months and for certain children aged 24–59 months with certain risk factors (including but not limited to asthma, cardiac disease, sickle cell disease, HIV, and diabetes, and household members of persons in groups at high risk (see MMWR 2002;51[No. RR-3]:1–31), and can be administered to all others wishing to obtain immunity. In addition, healthy children age 6–23 months are encouraged to receive influenza vaccine if feasible because children in this age group are at substantially increased risk for influenza-related hospitalizations. Children aged ≤12 years should receive vaccine in a dosage appropriate for their age (0.25 mL if 6–35 months or 0.5 mL if ≥3 years). Children aged ≥8 years who are receiving influenza vaccine for the first time should receive 2 doses separated by at least 4 weeks.

8. **Hepatitis A vaccine.** Hepatitis A vaccine is recommended for children and adolescents in selected states and regions, and for certain high-risk groups. Consult local public health authority and MMWR 1999;48(No. RR-12):1–37. Children and adolescents in these states, regions, and high-risk groups who have not been immunized against hepatitis A can begin the hepatitis A vaccination series during any visit. The two doses in the series should be administered at least 6 months apart.

9. **Influenza vaccine.** Influenza vaccine is recommended annually for children aged ≥6 months with certain risk factors (including but not limited to asthma, cardiac disease, sickle cell disease, HIV, and diabetes, and household members of persons in groups at high risk (see MMWR 2002;51[No. RR-3]:1–31), and can be administered to all others wishing to obtain immunity. In addition, healthy children age 6–23 months are encouraged to receive influenza vaccine if feasible because children in this age group are at substantially increased risk for influenza-related hospitalizations. Children aged ≤12 years should receive vaccine in a dosage appropriate for their age (0.25 mL if 6–35 months or 0.5 mL if ≥3 years). Children aged ≥8 years who are receiving influenza vaccine for the first time should receive 2 doses separated by at least 4 weeks.

Additional information about vaccines, including precautions and contraindications for vaccination and vaccine shortages, is available at <http://www.cdc.gov/nip> or at the National Immunization information hotline, telephone 800-232-2522 (English) or 800-232-0233 (Spanish). Copies of the schedule can be obtained at <http://www.cdc.gov/nip/recs/child-schedule.htm>. Approved by the **Advisory Committee on Immunization Practices** (<http://www.cdc.gov/nip/acip>), the **American Academy of Pediatrics** (<http://www.aap.org>), and the **American Academy of Family Physicians** (<http://www.aafp.org>).

TABLE 1. Catch-up schedule for children aged 4 months–6 years

Dose one (minimum age)	Minimum interval between doses			
	Dose one to dose two	Dose two to dose three	Dose three to dose four	Dose four to dose five
DTaP (6 wks)	4 wks	4 wks	6 mos	6 mos ¹
IPV (6 wks)	4 wks	4 wks	4 wks ²	
HepB ³ (birth)	4 wks	8 wks (and 16 weeks after first dose)		
MMR (12 mos)	4 wks ⁴			
Varicella (12 mos)				
Hib ⁵ (6 wks)	4 wks: if 1 st dose given at age <12 mos 8 wks (as final dose): if 1 st dose given at age 12–24 mos No further doses needed: if 1 st dose given at age ≥15 mos	4 wks ⁶ : if current age <12 mos 8 wks (as final dose) ⁶ : if current age ≥12 mos and 2 nd dose given at age <15 mos No further doses needed: if previous dose given at age ≥15 mos	8 wks (as final dose): this dose only necessary for children aged 12 mos–5 yrs who received 3 doses before age 12 mos	
PCV ⁷ (6 wks)	4 wks: if 1 st dose given at age <12 mos and current age <24 mos 8 wks (as final dose): if 1 st dose given at age ≥12 mos or current age 24–59 mos No further doses needed: for healthy children if 1 st dose given at age ≥24 mos	4 wks: if current age <12 mos 8 wks (as final dose): if current age ≥12 mos No further doses needed: for healthy children if previous dose given at age ≥24 mos	8 wks (as final dose): this dose only necessary for children aged 12 mos–5 yrs who received 3 doses before age 12 mos	

1. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP): The fifth dose is not necessary if the fourth dose was given after the fourth birthday.
2. Inactivated Polio (IPV): For children who received an all-IPV or all-OPV series, a fourth dose is not necessary if third dose was given at age ≥4 years. If both OPV and IPV were given as part of a series, a total of 4 doses should be given, regardless of the child's current age.
3. Hepatitis B vaccine (HepB): All children and adolescents who have not been vaccinated against hepatitis B should begin the hepatitis B vaccination series during any visit. Providers should make special efforts to immunize children who were born in, or whose parents were born in, areas of the world where hepatitis B virus infection is moderately or highly endemic.
4. Measles, mumps, and rubella vaccine (MMR): The second dose of MMR is recommended routinely at age 4–6 years, but may be given earlier if desired.
5. *Haemophilus influenzae* type b (Hib): Vaccine is not recommended generally for children aged ≥5 years.
6. Hib: If current age is <12 months and the first 2 doses were PRP-OMP (PedvaxHIB[®] or ComVax [Merck][®]), the third (and final) dose should be given at age 12–15 months and at least 8 weeks after the second dose.
7. Pneumococcal conjugate vaccine (PCV): Vaccine is not recommended generally for children aged ≥5 years.

TABLE 2. Catch-up schedule for children aged 7–18 years

Minimum interval between doses		
Dose one to dose two	Dose two to dose three	Dose three to booster dose
Td: 4 wks	Td: 6 mos	Td ¹ : 6 mos: if 1 st dose given at age <12 mos and current age <11 yrs 5 yrs: if 1 st dose given at age ≥12 mos and 3 rd dose given at age <7 yrs and current age ≥11 yrs 10 yrs: if 3 rd dose given at age ≥7 yrs
IPV ² : 4 wks	IPV ² : 4 wks	IPV ²
HepB: 4 wks	HepB: 8 wks (and 16 wks after 1 st dose)	
MMR: 4 wks		
Varicella ³ : 4 wks		

1. Tetanus, diphtheria, and acellular pertussis (Td) booster dose: Give 1 booster dose to all children aged 11–18 years, the interval determined by the age when the third dose was given.
2. Inactivated polio vaccine (IPV): Give 1 booster dose to all children aged ≥8 years.
3. Varicella: Give 2-dose series to all susceptible adolescents aged ≥13 years.

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